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JOURNAL
AND
PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

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Notices.

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Notes.

A CORRESPONDENT sends the following, which he hopes will be of use to those lanternists who are mechanically inclined: "For soldering, or tempering steel I use an old blow-through jet. I connect the hydrogen side to a gas bracket with a piece of rubber tubing, and on the oxygen side is attached a few inches of tubing, in the end of which is stuck the amber mouth-piece of a tobacco pipe, through which I blow. This makes one of the best style of blow-pipes I have used."

* * *

A LONDON firm advertise that they keep a stock of two million lantern slides. Two million lantern slides, with cover glass of ordinary thickness placed on top of each other, would form a column of about 4½ miles high, whilst if the same number be placed end to end, they would extend over 100 miles. As such a stock would doubtless have to be packed in the most economical manner, allowing any one particular slide to be getatable, it follows that a good-sized room would be required for their storage. Owing to the enormous weight, it is presumable that they are kept in the basement.

* * *

MR. JACKSON, of Manchester, informs us that an explosion may take place in a gauge which has not been used in connection with a cylinder of hydrogen or coal gas, if it contains any oil or tarry matter when suddenly connected with a cylinder of compressed oxygen. The mere compression of a column of air in the gauge tube is sufficient to ignite the oil.

* * *

WE would remind our readers that Messrs. Perken, Son, and Rayment are sole agents for the "Fantocinni Slides," an article on which appeared in our issue of April. Twenty-six different styles are now ready, and the prices are very moderate, considering the amount of work and patience exercised in making and putting them together.

Colonel T. Dean, writing from Simla, India, says, in his article in June issue, page 119, line 14: "Rhigolene" and not "Benzoline" is what Mr. Ives recommends.

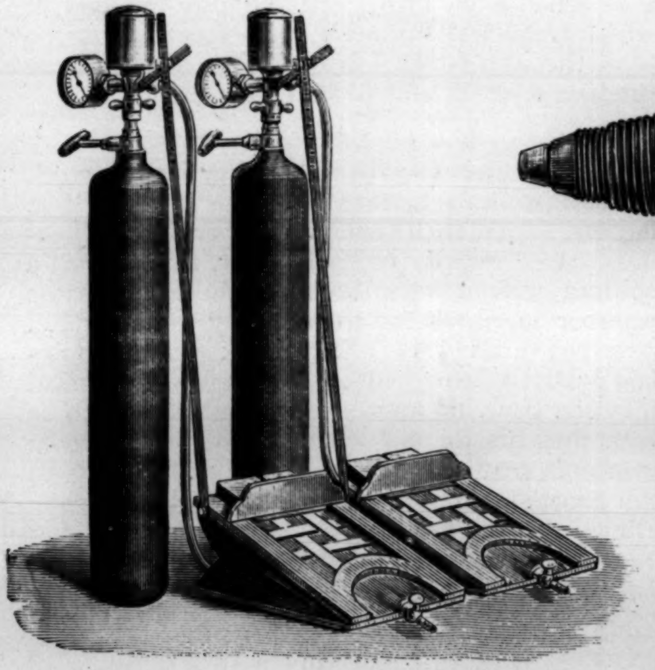
:o:

Novelties in Lantern Matters—I

In connection with apparatus pertaining to lanterns, it is the intention of many leading firms to introduce several new features this season.

Many ideas are still in the experimental stages, and consequently nothing can be said of these at present. Of such as are about ready, we will, however, give our readers a few particulars.

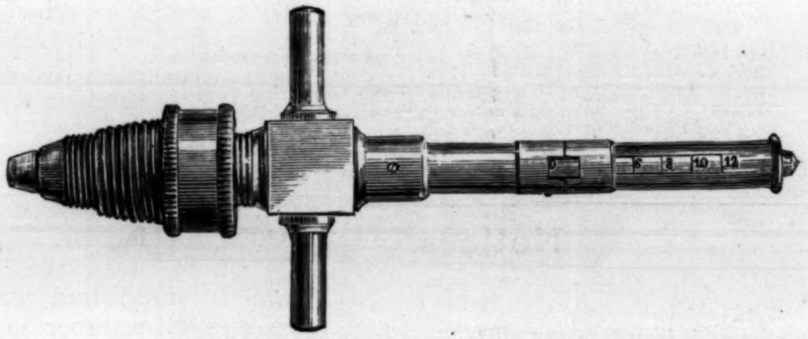
Mr. W. C. Hughes advises the employment of a patent supplementary gas receptacle, through which the gases pass before reaching the lanterns; this, he claims, is essential to those showing effects with triple lanterns.



It consists of two small gas-bags, between boards, one to each gas-bottle. Upon the upper flap is a small weight, which operates upon the gas-bag in the same manner as in the case of the larger type of bag in general use. A vertical rod, working on a pivot, extends from each of the upper flaps, and connects with an arm or lever upon the tap of the regulator, and a rubber tube connects each bag with the outlet of the regulator belonging to it. A cock is provided in the front of each bag, to which is connected the tube leading to the burners.

The Enterprize Photo Company, who, by-the-bye, were the first to introduce clamps for use in binding lantern slides, are bringing out a pretty model with polished brass pillars on a turned stand. Some months ago, when they first introduced these clamps, we gave our readers a description of them. The principle of that and the present style (which we illustrate) is the same; but the latter is a finer and more ornate apparatus.

A metal binder for slides will also be introduced as soon as the requisite machinery for turning them out is finished. Meantime, we have received a sample made by hand. It consists of a strip of metal, bent so as to clasp the glass, and to fit at the corners of the slide; a tongue at one end is passed through a slot at the other, and bent over, thus keeping the binding firmly in position.



Mr. Suiter has for some time been experimenting with a new form of gauge, and has at last perfected one which he pronounces absolutely safe under all conditions. The gauge is about the length of a lead-pencil, and the pressure in atmospheres is seen through an opening in the sliding ring (as shown).

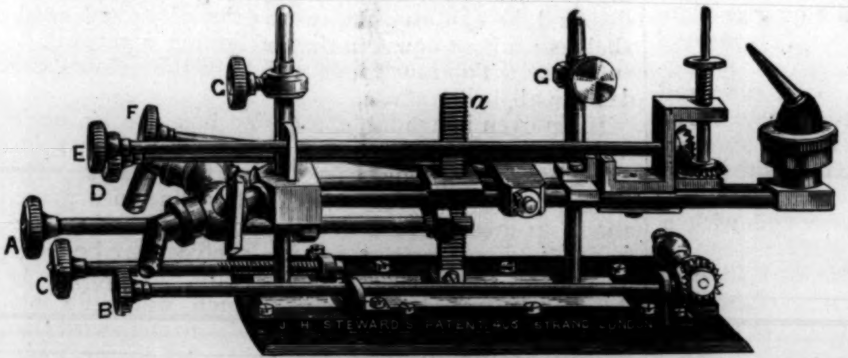
When one hires sets of framed effect-slides, much trouble is often experienced in obtaining correct registration. It is quite out of the question to add to, or take from, any of the woodwork, as the slides must be returned in the same condition as received. Those who go in for effects will welcome the introduction of a supplementary sheath, the invention of Mr. Rockliffe, and which is being manufactured by Messrs. Newton and Co. The sheaths are placed in the lantern stages, and the slides placed therein are adjusted and secured with clamping screws; the whole is then withdrawn, and is ready for use at any time. One feels a degree of confidence when the registration is a certainty; and by using these sheaths, with the slides previously adjusted, perfect registration can be relied upon.

Taking into consideration the accidents which happen by the bursting of gauges, Mr. J. H.

Steward is bringing out a spring balance for weighing the cylinder, and thus ascertaining the quantity of gas in it.

As usual about this time of year, numerous new sets of slides are brought to public notice. Messrs. York are introducing, amongst others, sets of the Australian Colonies, Great Pyramid, Riviera, An Hour with the Church of England, Life of Wesley, May Queen, Fireman's Wedding, &c.

We were present a short time ago at Mr. J. H. Steward's establishment, when Mr. G. R. Baker was comparing the effects of a new form of mixing chamber and jet outlet. So favourable were the comparisons, that Mr. Steward's premier jet will be fitted with it. We give a cut of this jet, with the new nipple and chamber attached. Although the nipple may not be quite so ornate as the previous form used by this firm, we are enabled to say that the amount of light given is much greater.



A new lantern objective, which it is claimed by the makers (Messrs. Taylor, Taylor & Hobson) will surpass the one of their make which won distinction at the Crystal Palace, is about to be introduced. We have tried this objective, and find it gives fine definition and a maximum of light.

An improved cylinder valve has been brought out by the Gas Compression Co. (Manchester). The spindles of these valves are made of special bronze, and it is claimed that they do not stick fast, and can be opened and closed almost as easily as an ordinary water-tap. The flow of gas can be regulated with the greatest nicety, and regulator taps are unnecessary. It is impossible to turn on the gas with a sudden rush. This company are also introducing metallic brackets for securing cylinders to a table or shelf whilst in use. They are made to suit all sizes, and can be supplied to hold the cylinders either vertically or horizontally. They consist of a double clamp—one of which secures the bracket to the table-top or edge of shelf; and the other is a ring, into which the cylinder is inserted, and the ring is then tightened on to the cylinder by a screw.

In order to prevent the too rapid ingress of gas from a cylinder to a gauge, and thus avoiding risks of explosions through the generation of heat, Mr. William Morton Jackson, of the Manchester Oxygen Company, has patented an attachment, whereby the compressed gas can slowly enter the gauge. In the tail-piece of the gauge a screw-thread is cut, and a metallic plug, having a fine hole drilled longitudinally, is screwed into position. Next to this certain materials are placed; then another plug similar to the first is screwed in position. By adjusting the pressure on the layers between the plugs the passage of gas can be regulated to any required velocity.

Everyone is, we presume, familiar with lithographic slides, and even in this there is a novelty this season. Messrs. Theobald and Co. now prepare these pictures, so that there is no need for transferring them to glass and then rendering them transparent. They are now printed on specially-prepared paper, which has been soaked in oil, gelatine, creosote, and other liquids, which renders it transparent. These pictures only require to be placed between two glasses and bound round. Among the special advantages are: If the slide should happen to fall and get broken, a new piece of glass is all that is required, the picture remaining intact; there are no specks, as very frequently was the case when they had to be rendered transparent after being transferred to glass. When sending slides to foreign countries, as much as fifty to sixty per cent. duty has to be paid; but as these unmounted lithographic slides in sheets come under the heading of scrap pictures, merely five per cent. duty is charged. Twenty-four new sets have been issued, comprising travels, nursery tales, and effects. This firm have also brought out a number of photographic slides, and a new and convenient lecturer's lamp with a red signal at side.

As soon as certain improvements are effected, Mr. A. W. Scott intends introducing a cheap Verak front, which may be applied to the lower half of a bi-unial, thus leaving the upper section for ordinary views. Special slides are being prepared for the Verak. Mr. Scott will also bring out a new oxy-calcium jet, but as it is not yet protected we cannot at present give any particulars.

Messrs. G. W. Wilson and Co. issue such a number of sets that it is impossible to particularise, as they have scenes from everywhere and of everything. Some idea of the number may be obtained when we say that their list of new slides for last season occupied two pages of closely-printed matter in our advertising pages.

(To be continued.)

Hand-Cameras for Obtaining Slides for the Lantern.

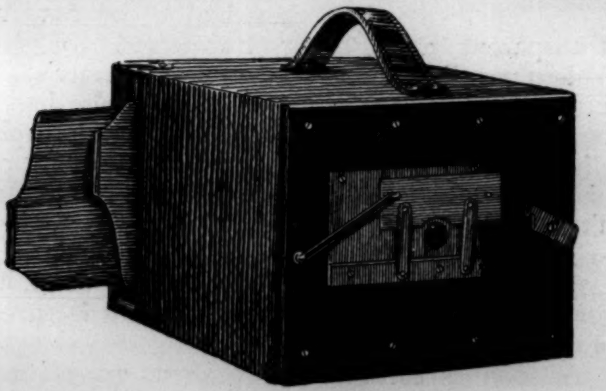
No. 2	"Quadrant" ...	(W. H. Humphries & Co.)	,,	June 1st, 1890.
,, 3	"Eclipse ...	(J. F. Shew & Co.)... ...	,,	July 1st, ,,
,, 4	"Eureka" ...	(W. W. Rouch & Co.) ...	,,	Aug. 1st, ,,
,, 5	"Key"	(Platinotype Co.)	,,	Sept. 1st, ,,
,, 6	"Optimus" ...	(Perken, Son & Rayment)	,,	Oct. 1st, ,,
,, 7	"The Griffin"	(Griffin & Sons, Limited)	,,	Nov. 1st, ,,
,, 8	"The Swinden-Earp" Patent	... ...	,,	Dec. 1st, ,,
,, 9	"Collins"	(C. G. Collins) ...	,,	Feb. 1st, 1891.
,, 10	"Kodak" ...	(Eastman Co.) ...	,,	Mar. 1st, ,,
,, 11	"Guinea" ...	(Walter Griffith)... ...	,,	April 1st. ,,
,, 12	"Vanneck" ...	(Watson & Sons).. ...	,,	May 1st, ,,
,, 13	"Chadwicks"	(W. I. Chadwick) ...	,,	June 1st, ,,
,, 14	"Bonanza" ..	(R. & A. J. Mercer) ..	,,	July 1st, ,,
,, 15	"Repeater" ..	(Cusworth)	,,	Aug. 1st, ,,

No. 16.—"MARVEL."

IN these days of low-priced hand-cameras, there are few who would be prohibited from purchasing when one that answers its purpose can be obtained for the sum of half-a-guinea. Messrs. Wilson and Son, of Talbot-square, Blackpool, have placed a quarter-plate camera upon the market at this price. It is termed the "Marvel."

At the price mentioned it is not to be supposed that the instrument is made of polished mahogany or leather covered: but the one in question is strongly made of millboard, strengthened at the requisite points with wood, and is covered with American cloth. It measures 7in. × 6in. × 5in., and is provided with a handle for carrying purposes.

The camera is supplied with a double dark slide of ingenious design, and which is of millboard, with a metal binder and draw slips. The back of the camera is made to hinge down, and has two springs, which keep the dark slide in position at the focal plane. Although the dark slide can be inserted in the slot for the purpose without opening the back, we find in practice that when turning the slide it is advantageous to liberate the catch at the back (this may be owing to the springs on our camera being rather strong).



The lens is achromatic, and is 4¾in. focus, and works at F11.

The shutter is simple and effective, and is capable of giving an exceedingly quick exposure. It is on the parallel-ruler principle, the lower arm being fastened to the camera, whilst the other is cut in such a manner as to act as a shutter. The shutter is set with the finger, and held by a small hook at side, and is released by pressure on the end of the hook-lever, when the tension of an india-rubber band causes the exposure to be effected.

Colouring Lantern Slides.—No. 3.

By A. W. Scott.

(*Continued from page* 138.)

The Drying Box.—Oil colours take so long to dry upon glass, that a drying box is of considerable value in shortening the time requisite for this operation. In tinting photographic slides, if a little care be used, it is practicable to cover and bind up the slides while the paint is wet, and this plan is a safeguard against dust, and does not prevent the drying, although it may delay it to some extent. But for many subjects, especially where only the outline is provided, it is necessary to divide the work into two or three divisions, called first painting, second painting, &c.; each layer of colour being thoroughly dried and hardened before the subsequent work is put on. In such cases, it is necessary to use heat to assist and complete the drying process. If the artist has a good oven at his disposal, he can use that, resting the slides on wood-shelves; a heat equal to that of boiling water will be sufficient. Too much heat will burn the colours and destroy all brilliancy.

If no oven is available, a drying box can be made with the help of a half-plate light-tight photographic wood-box, with grooves for twenty-four plates. The sliding lid is removed and a lid of fine wire gauze, about 50 meshes to the inch, stiffened with a wire frame, is fitted instead. A few shelves may be made by cutting some coarse gauze wire, 20 meshes to the inch, into half-plate sizes, which will slide into the grooves. The box is placed on end, with the shelves horizontal, and the gauze lid to the front. One or two pyramid night-lights may be then put inside at the bottom of the box, and the slides which are to be dried are placed on the shelves near the top of the box. There should be two vacant wire gauze shelves between the lights and the lowest slide, to distribute the heat evenly. If an open fire is available, the night-lights need not be used, as sufficient heat may be got by putting the box before the fire at about eight inches distance, with the gauze lid facing the heat. The heat may be increased by placing the box nearer the fire, and reduced by withdrawing it.

Having collected the necessary materials, we may consider the best methods of using them. The application of colours with a brush does not present any great difficulty to a beginner, provided the right medium is used to dilute the pigment. With very small touches of deep colour, varnish pigments may be simply mixed with turpentine, as this leaves a thin film after drying. For larger spaces, special varnish may be mixed with the colour, sufficient to make it flow evenly. If subsequent touches of colour are needed, it is advisable to dry the first coat with the aid of heat, before applying the second.

Dabbing and Stippling.—When broad spaces, such as the skies of landscapes, have to be evenly tinted, the colour is roughly brushed over the space, and then a dabber is applied to make the tint even and smooth. This operation is simple enough to an expert, but it seems to be a great stumbling-block to beginners; it is the *pons asinorum* of slide colouring. The great magnifying power of the limelight lantern causes the painted sky of the novice to appear on the screen as if a tornado were blowing, and all sorts of strange and wonderful objects had been spirited up from the ground, and were floating in the air. Then the amateur, after comparing his work with the beautifully even skies produced by professional firms, such as York or Wrench, often concludes that there is some trade secret in the matter, and that it is useless for him to go on. If his bump of perseverance be well developed, he may, however, keep at his task, and after about fifty attempts, find that he is making decided progress, the trade secret consisting mainly of practice, and mixing the pigment with the correct proportion of varnish or magilp.

Some colours are easier to dab than others; Prussian blue is, perhaps, the best of all, as it is so intense that blue tints of any depth can be produced with ease. The blacks are also good for dabbing, ivory black being, perhaps, the best. A mixture of blue and black is useful for night skies Burnt umber is the best dabbing brown, and burnt sienna is also valuable for warm browns. Crimson lake is the best red, but it can only be dabbed in pale tints. Italian pink is the best yellow, and mauve is good for purple effects in clouds, when modified by other pigments.

The best dabber is the finger-tip, with the nail cut short. The finger to be selected is that which has the softest and smoothest skin; generally the third diget of the right hand is handiest. Ladies have, as a rule, better dabbing fingers than men; rough work is apt to cause the skin to be horny and furrowed. The rubbing of the skin on fine glass-paper may be tried, in order to remove rugosities; but this expedient is of doubtful value, as after a day or two the skin will be rougher than at first. There is no objection to wearing a finger-stall on the dabbing finger, when engaged in other work, as a means of keeping the skin soft.

The finger is pressed gently on the glass, and is held at an angle of 45 deg., for tinting broad spaces, though for working close up to an outline it may be better to hold the finger nearly at a right angle with the slide. The dabbing should be a gentle process, not a violent hammering, tending to roughen the skin, and also to smash the slide. It is sufficient to raise the finger a ¼in. between each touch, and it is best to travel in little circular paths about ½in. in diameter, overlapping each other spiral fashion, giving about six dabs to each circle. Starting at the top of the slide—say, a landscape with sky—we may dab horizontally across it, getting the colour roughly evened, and then by a combination of the spiral with a zig-zag path, gradually approach the horizon. If the colour is too deep, the finger may be wiped occasionally on wash-leather. The horizon of a landscape is generally of a much paler blue than the zenith, the colour gradually deepening as we go upwards. Having made the sky roughly even and of correct depth of colour, we can complete the dabbing by commencing again at the zenith, working with very light touches to make the tint as even as possible, proceeding in horizontal lines backwards and forwards, and approaching the horizon by the zig-zag path as before.

This is the method of dabbing an even tint; it requires practice and, at first, patience. The time spent in dabbing a plain sky may be five or ten minutes with a practised hand; with the beginner it will probably be a lengthy operation.

But practice is not the only requisite, the adjustment of the colour and mediums is equally important. If ordinary oil colour is used, the addition of just enough mastic varnish to cause it to be of a firm consistence without being sticky is useful.

The pale tints of intense colours, such as blue and black, both megilp and mastic may be added. The exact proportion will depend on the oiliness of the colour, and can only be found out by repeated trials of the mixture.

Half the battle will be won when the colour is prepared in the condition best suited for dabbing; and if the varnish colours supplied by the writer are used, it will only be necessary to put a drop of the paint from the bottle on the palette, touch the drop with the finger-tip, and commence dabbing forthwith, without troubling about any mediums. If very pale tints are wanted, a little special varnish may be added; but this is rarely required.

On Toning Bromide Prints.

By S. Herbert Fry.

With the question whether bromide prints want toning, ought to be toned, or are permanent if toned, this article has nothing to do. It is not exactly what to do, but the particular way to do it, to paraphrase Mr. Albert Chevelier's song. To tone bromide prints with ferricyanide of potassium and nitrate of uranium, it is important to fix, wash, and dry the print before attempting to change the colour. Have a piece of glass larger than the print to be operated upon. Soak the print in clean cold water thoroughly. Lay it down wet, and face upwards, upon the sheet of glass. Take a large handful of cotton wool, soak it like a sponge in clean cold water, and rub it over the surface of the bromide print so as to remove the surplus liquid, and "squeegee" the print down flat upon the glass. Have some toning solution at hand in a saucer. Wring out the water from cotton wool, and soak it in the toning solution. Place a couple of fingers of the left hand upon the same side of the print, and with the cotton wool saturated with toning in the right hand, boldly and freely work it all over the face of the print, until the desired tone is there. Keep the cotton wool well saturated and moving freely, and there will not be any staining.

When sufficiently toned remove any surplus ferricyanide solution with the wool, and proceed to wash the print with clean cold water with a fresh cotton wool sponge, until the yellow stain is removed from the fibre of the paper. Sometimes this won't all come out, especially if a very rough-surfaced and absorbent paper be employed; but many prefer a tinted to a white paper effect. There is nothing new in this method, but it is, nevertheless, the best way of using the uranium toner, and to avoid staining and other irregularities. Less solution is required, and no large bath. The toning solution is made as follows:—

No. 1.	Ferricyanide Potass	20grs.	To be mixed in equal parts before required for use.
	Acetic Acid	...½oz.	
	Water	10oz.	
No. 2.	Nitrate Uranium	20grs.	
	Acetic Acid	...½oz.	
	Water	10oz.	

Hints and Helps.

By C. E. Rendle.

PLATINUM FOR LANTERN BODIES.

In the July number of the *Optical Magic Lantern*, page 128, the Vice-president of the Lantern Society, in his interesting article, invites information as to the relative cost of platinum and aluminium for building lanterns. Thinking a more able pen than mine would have taken the matter in hand, I waited the August issue before replying. Any remarks I may make from time to time will be found absolute facts, founded upon a practical experience of over a quarter of a century. If platinum is not the most beautiful of the precious metals, it certainly takes first place, *as* a precious metal regarding its uses; and second place when embellishment is considered, for when once properly polished it retains its mirror-like appearance for years. If I dub it as imperishable, I am not far off the mark, for the chemist, the refiner, the goldsmith, the dentist, and many others, thank their lucky stars that they can boil the strongest acids, and stew the vilest concoctions, without injury to their little platina pots and pans. Platinum is soft and pliable, but dreadfully tough, and as a consequence very strong, its toughness making it difficult to polish. In spite, however, of all its good qualities, lantern bodies will not make its acquaintance just yet (at least such is my humble belief), for there are two unfortunate drawbacks which mar its adoption for the purpose in point—firstly, its weight; secondly, its cost. It is the heaviest of all metals, heavier than pure gold, twice the weight of silver, and three times the weight of iron.

Now, if an iron body weighs two pounds, a body of the same dimensions in the metal under discussion will weigh 5¾lb. This brought to ounces (Troy) at the present market value 60s. per oz., gives an appalling result, and one which I think will settle this question. This accounts for the nipples *only* of the oxy hydrogen jets being made in platinum, its uses might with great advantage be extended to the lime pin, but further than this (extra 10s. on cost of jet) I am not prepared to go.

In closing this article, I would add, a lantern body made of gold could be produced at a much less cost than platinum, and one of silver one-twentieth the amount.

I hope to say something of Aluminium in my next paper.

Table of Specific Gravities of Eleven Metals.

1.	Platinum	21·4
2.	Gold (Pure hammered)	19·35
3.	Silver (Pure)...	10·47
4.	Copper (Sheet)	8·95
5.	Nickel...	8·82
6.	Brass (Cast)	8·4
7.	Gun Metal	8·4
8.	Steel	7·82
9.	Bronze (90 per cent. Copper) ...	7·68
10.	Iron (Cast)	7·18
11.	Aluminium	2·56

Wanted, a Good Portable Screen.

By Edward Altman.

Many of us, I feel certain, are of opinion that the subject of screens is one which will stand a little discussion. Some screens as at present made are suitable enough so long as they are kept at a permanent place of exhibition, but matters are quite different when one has to be conveyed with the usual apparatus by train, boat or cab. What we require is a good opaque (or nearly so) screen. Faced screens can be obtained, it is true, but those have to be kept on a roller, and the inconvenience of taking around a heavy roll of 10ft., 12ft., or 16ft. long, is doubtless well-known to those who have tried it. Frames for sheets can be made to fold up in a compact space, and the package, though perhaps it may be somewhat heavy, need not be inconveniently so. To my mind a perfect screen is one which can be folded up in small space, be opaque, and yet when stretched upon its frame be comparatively free from creases. Calico, linen, &c., will not do, as they transmit light. Mackintosh was suggested for this purpose in the *Optical Magic Lantern Journal*, but I fear the great cost is against it. Perhaps, if the Editor will open his columns to the discussion of what a good portable screen should be, we may, by a combination of opinions, be able to arrive at a good material for the purpose.

[We shall be pleased to devote space to this subject.—Editor.]

:o:

Stereoscopic Effects with the Optical Lantern.

By Oscar S. Teale.

As the image of an object is by means of a double convex lens, fixed at a proper distance, conveyed to a definite surface, a screen or the ground glass, so is the image received by the "crystalline" lens, and conveyed to the retina of the eye. Upon this simple statement would seem to depend the possibility of producing upon the lantern screen a projected image in full relief, as represented when viewed through the lenses of the stereoscope—the theory of which instrument is identical with the philosophy of the human eye. In order that our subject may receive the full benefit of the analysis desirable to give it, it is also necessary that we should consider the rules that govern the art of perspective. which is analogous with the theory and philosophy of binocular and monocular vision, both of which faculties or conditions enter for a limited share of attention

First, it may be well to consider a few of the rules which govern the art of perspective, inasmuch as the reproduction of all subjects pictorially depend upon them, and no true representation can be produced without observing them, either on the flat or in relief.

The question then naturally arises, What is perspective? The word perspective comes from the Latin *perspicio*, to see; consequently the art of perspective is the art of representing objects on a definite surface, so as to affect the eye in the same manner as the object itself would when viewed from a given point. The last sentence of the description just given may be looked upon as the key, which will aid in revealing the mystery we seek—viz., "when viewed from a given point."

The next important factor is the "line of horizon," which is an imaginary line, parallel with the horizontal axis of the eyes. It may be best defined as the line of separation between the earth and sky, or water and sky, when looking out upon a vast prairie or the ocean.

The "point of station" is the point of observation or view, the place at which the spectator stands while viewing the subject, and is the "given point" referred to as our key. The "point of sight" is that point in the picture resting on the line of horizon directly in front of the spectator, and a line drawn from the eye of the spectator to the point of sight (which line is the central visual ray), would make an exact angle of 90 deg. with the picture plane, and is of necessity the shortest of all visual rays.

It is not necessary to penetrate further into the technicalities of the art of perspective just at this time, as the foregoing are the salient points affecting the subject of this paper, but we will touch upon other details as we may have need.

The second element for consideration is natural vision in its two phases, binocular and monocular Without troubling about the anatomical construction of the organs of vision, we will confine our investigation to the function of the organs optically considered.

It is a well-established fact that each eye sees at the same time a different view of the same object, hence the slightest change of position of the eye must of necessity produce an impression or picture quite different, in a perspective sense, from the one originally beheld. To be more exact, these pictures on the retina of each eye are mathematically different in the relations of all points to each other, and upon this difference is based the faculty of binocular vision, the distance between the eyes, or rather the horizontal axis of the lenses of the eyes, serving as the base line of a series of triangles, by means of which all points of view are fixed and the mind enabled to judge of their distances from the eye.

If the eyes be closed and opened alternately while focussed on an object in the near distance, the mathematical difference referred to will be noticed at once. If a pencil or rule be held vertically at a short distance in advance, and midway between the two eyes, this difference will be unmistakably marked, and provide conclusive evidence that in their normal position each eye sees more of the object on that side corresponding with its own position; thus the right eye sees more to the right of the object, and the left eye to the left.

Now, if we imagine lines drawn from the eyes to all parts of the object before us, and a vertical section cut through these lines, the section so cut, if it could be "fixed," would represent an exact image of the object, and the size or scale of that image would depend upon the distance from the eye at which this imaginary section was cut. To illustrate: As we look through a window we see the image of distant objects on the window-pane. The glass in this case represents the vertical section, or picture plane, and the image reduced in size is due to the intersection with this plane of the visual rays or imaginary lines proceeding from the eyes, and here we have the fundamental principle of the art of perspective.

In the figure of our illustration, viewing the scene through the window-pane, it must be taken into consideration that there are two sets of imaginary lines or visual rays, one distinct and complete set proceeding from each eye. These two sets of lines converging at two separate points, a few inches apart, would produce two distinct images on the pane of glass, according to the principle before described, that is, a line drawn from each eye to one and the same point of the object would intersect the window-pane at two separate points in exact ratio with the triangle formed by the base line represented by the plane of the eyes and the visual rays proceeding from the two points of vision. Thus a double picture, one overlapping the other, is produced on the picture, plane, or plate of glass; but these double pictures are assimilated or registered by the natural functions of the eyes, the result of a combined physical and mental effort, cultivated, it is claimed, during infancy. In reality the adjustment or registering of this double image is accomplished by looking through the glass focussing the eyes on the distant object in its natural position; the vision being thus concentrated on the distant object, no confusion results from the double image formed at the "plane of the picture," the window-pane; the same effect is observed when viewing objects reflected by mirrors.

If the eyes could be focussed on the surface of the mirror, and allowed to rest there, a double confused image would result; but, as in the case of the window-pane, the eye apparently penetrates the mirror, and sees the reflected image at a distance beyond the mirror, exactly equalling the distance of the mirror from the object reflected. The double image or picture referred to is the "stereoscopic view," which may be secured or copied in what, for our purpose, we will call its optical position, by the camera, when of proper construction; the position of the two views of the same object as produced on the ground glass of the camera varies, however, from the imaginary image on the window-pane, in that, on the ground glass there are two complete and separate pictures of the object, without overlapping or confusion. The reason is concurrent with the conditions of viewing the object with the natural eyes, each lens of the camera catching the view or position of the entire scene that the corresponding eye would, when closed and opened alternately, as described in the early part of this paper; in the camera the overlapping or confusion is avoided by inserting a blackened partition or separator at right angles with the front of the camera, and geometrically parallel with the centre ray of light passing through the lenses; and since the horizontal axis of the two lenses in the stereoscopic camera coincide, the perspective horizon of the pictures produced thereby must of necessity agree, and the stereoscopic perspective must harmonise.

In mounting the finished pictures for the stereoscope, the same conditions as to centering and preserving the true perspective horizon must be observed, or muscular contraction and distortion of the eyes would attend the viewing of the finished picture.

The finished double picture, or "stereoscopic view," if held in the hand, and inspected in the same manner as an ordinary single print or picture, would be quite as void of the desired relief effect as would a picture taken with a single lens camera; it must, therefore, be placed in a proper position for inspection, and the eyes that would be regaled by its truthful and beautiful reproduction, or rather representation of nature, must of necessity be reduced to the same proportion or scale as the picture, and must rest upon the exact horizon of the picture, that the proper diminution of "vanishing lines" of the picture may be availed of.

These conditions observed, and the eyes of the spectator being (figuratively) reduced to the scale of the picture, and aided by the prismatic form of lens for the purpose of conveying the visual rays in divergent lines to the picture, the overlapping and confusion is avoided, as each retina receives but one impression, and it requires but a small exertion of the mind to merge the two separate impressions thus received into one picture, and we are enabled to see depth, distance, and geometric solidity, which constitutes the beautiful relief in nature. The relative distance between the object lenses of the stereoscope and the picture being proportionate to the scale of the picture, the illusion is perfect, and the senses easily persuaded that the objects in the picture are of their original and natural size. It should be here noted that the finished picture is in this case viewed from a "point of distance," mathematically proportioned to the distance from which the lenses of the camera (representing the eyes) occupied at the time of taking (or viewing) the subject in its original position, which accounts for the perfection of the illusion.

Monocular visioned people, on the other hand, do not enjoy this degree of boldness and relief in nature —their view of all objects being limited—seeing but one view or position of the object at a time, they must therefore depend for the relief effect upon the atmosphere or "aerial perspective," only for the relative distance of objects one from another, the more distant being the more obscured, or less defined, because of the increasing density of the atmosphere intervening. It would seem but reasonable that a landscape photographed with what is commercially known as a "universal focus," or a focus of great depth, must of necessity appear flat, inasmuch as sharpness in the foreground, middle distance, and background, at one and the same time, must be obtained at the expense of the atmospheric effect of "aerial perspective."

(To be continued.)

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Notes and Queries.

Robt. Wood writes: "I have a lens and stops, and want to mark each of the latter according to its relative value of F so and so. Can you tell me how to ascertain this? *Answer.*—First ascertain the focus of the lens, then see how many times the diameter of the stops will divide into the focus. Thus, if the focus of lens be 6in., and the diameter of a stop be ½in., mark it F 12.

Paper—We could not say definitely without seeing it; probably it is bromide paper.

Amateur writes: "I want to invest in a hand-camera, but there are so many different kinds that I do not know which will suit my purpose best. Will you kindly say which you think the best?" *Answer.*—You do not enlighten us as to your *purpose*, but if you will consult our columns, commencing March 1, 1890, you will find descriptions of seventeen which we have tried. As the price may perhaps be an object with you, we may state that those described run all the way from about ten shillings to ten pounds.

Novice.—Replied by post.

E. J. R. writes that he cannot make our reference table tally with what his lens will do, and says, "I have sent the lens, which is 6in. focus, by Carter Paterson and Co., so as to show you that your table must be wrong. I have carefully consulted your table and measured the distance, and at 30ft. from screen can only get a picture 11ft. in diameter, whilst, according to table, it should give 15ft. *Reply.*—We are perfectly correct, but your lens is not 6in. focus, it is 8in., and you will find the disc 11ft. 3in. You have evidently measured the focus from the back lens, instead of equi-distant between the two combinations. The lens was returned as requested.

Rupert.—Fittings such as you require for the lantern you are making can be obtained from many firms in Clerkenwell.

T. Meade, jun.—Scented kerosine is an article of commerce.

Subscriber.—The two lenses are the same in every respect, although they are known by different names.

J. Perry.—We cannot understand the nature of the developing-tray from the description sent. As you state that it is your intention to send us a sample when finished, please make it quarter-plate size.

Novice.—You can make lantern slides such as you describe for advertising purposes, as follows:—Clean the surface of the glass which is to form the slide, then apply the tongue to the surface of the glass, taking care that every part is moistened; this will dry in a minute or so and leave no stain. You will now be able to write or trace upon the glass without the ink running. The ink can be prepared by putting a piece of sugar, about the size of a pea, in a penny bottle of ink. The drawing or lettering thus made will be very faint, and must be intensified by rubbing it over with a tuft of cotton wool which has been dipped into lampblack; the addition of the sugar to the ink causes the lampblack to adhere, whilst it will not "take" on the other parts.

Lantern.—Mr. Ransome's address is 122, Newington Butts, London, S.E.

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Correspondence.

[*To the Editor.*]

DEAR SIR,—Some time ago I noticed an account of an explosion of a regulator, supposed to have been brought about by some carbonaceous matter in the regulator becoming ignited by the pressure of gas. This is a serious matter, and it would be well for lanternists in general if the subject was discussed, and the views of experienced operators obtained thereon. It seems that great care should be exercised in admitting the gas into the regulator from the cylinder, and even then, should not some substantial reason be given for the accident above-mentioned, confidence will be shaken in the use of cylinders even for the blow-through jet. Hoping that the matter may be taken up and our minds set at rest, I am, dear Sir, yours faithfully, INQUIRER.

[We shall be glad to hear the views of our readers.—ED.]

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THE LANTERN SOCIETY.—Arrangements have been made with the American Lantern Slide Interchange to exchange a set of 100 slides this season; and a set of 100 American slides will be available for the use of individual members from October to May, and members will be able to book these slides for any dates they may wish by writing to the hon. sec., and paying cost of carriage both ways. In return, the Lantern Society have to send to America a set of 100 slides early in October, and the council therefore ask all those members who make their own lantern slides to communicate with the hon. sec. *at once.* The exchange will only be temporary, and the slides contributed will come back to England in May, 1892, when they will be returned to their owners.—CHARLES E. GLADSTONE, Hon. Sec., 6, Bolton-street, W.